Please add new claims 34 through 42, and amend claims 1, 4, 7, 8, 9 and 25 — all as set forth below.

1   1.   (currently amended)   Apparatus for printing a desired
2   image on a printing medium, based upon input image data, by
3   construction from individual marks <u>of at least one colorant,</u>
4   formed in a pixel grid; said apparatus comprising:
5   <u>for each colorant,</u> at least one <u>respective</u> multielement
6   ~~incremental~~ printing array that is subject to colorant-depo-
7   sition error;
8   means for measuring such colorant-deposition error of the
9   at least one array;
10   means for modifying a multicolumn, multirow numerical
11   tabulation that forms a mapping between such input image data
12   and such marks, to compensate for the measured colorant-depo-
13   sition error; and
14   means for printing using the modified mapping.

1   2.   (original)   The apparatus of claim 1, wherein the mapping
2   is selected from the group consisting of:
3   an optical-density transformation of the image data to
4   such construction from individual marks; and
5   a spatial-resolution relationship between the image data
6   and such pixel grid.

1 3. (original) The apparatus of claim 2, wherein:

2 the optical-density transformation comprises a halftoning

3 matrix; and

4 the spatial-resolution relationship comprises a scaling

5 of the image data to such pixel grid.

1 4. (currently amended) The apparatus of claim 1, wherein:

2 said at least one multielement ~~incremental~~ printing ar-

3 ray comprises a plurality of multielement printing arrays that

4 print in a corresponding plurality of different colors or col-

5 or dilutions, <u>respectively</u>, each multielement printing array

6 being subject to a respective colorant-deposition error; and

7 the measuring means and the mapping-modifying means each

8 operate with respect to each one of the plurality of multiele-

9 ment printing arrays respectively.

1 5. (original) The apparatus of claim 4, wherein:

2 for at least one of the plurality of multielement print-

3 ing arrays, the colorant-deposition error comprises a respec-

4 tive pattern of printing-density defects; and wherein:

5 the measuring means comprise means for measuring the

6 pattern of printing-density defects for each multielement

7 printing array respectively; and

8 the modifying means comprising means for applying the

9 respective pattern of defects, for at least one of the mul-

10 tielement printing arrays, to modify a respective said map-

11 ping.

6. (original) The apparatus of claim 4, wherein:

for at least one of the plurality of multielement print-ing arrays, the colorant-deposition error comprises a swath-height error;

the measuring means comprise means for measuring the swath-height error for each multielement printing array re-spectively; and

the modifying means comprise means for applying the respective swath-height error, for at least one of the multielement printing arrays, to modify a respective said mapping.

7. (currently amended) The apparatus of claim 1, wherein:

the colorant-deposition error comprises a pattern of printing-density defects;

the measuring means comprise means for measuring the pattern of printing-density defects;

the modifying means comprise:

means for deriving a correction pattern from the measured pattern of printing-density de-fects, and

means for applying the correction pattern to modify a halftone thresholding process; and

for each colorant, the printing means comprise means for printing such image incrementally, using the modified halftone thresholding process.

1   8.   (currently amended)   The apparatus of claim 1, wherein:

2   the colorant-deposition error comprises a swath-height

3   error or otherwise corresponds to a_n_ optimum distance of

4   printing-medium advance;

5   the measuring means comprise means for measuring the

6   swath-height error or determining the optimum distance;

7   the modifying means comprise:

8

9   means for deriving a correction pattern from the

10   measured swath-height error or determined opti-

11   mum distance, and

12

13   means for applying the correction pattern to modify

14   a halftone thresholding process; and

15

16   for each colorant, the printing means comprise means for

17   printing such image incrementally, using the modified halftone

18   thresholding process.

1   9. (currently amended) A method of printing a desired image,

2 by construction from individual marks <u>of at least one color-</u>

3 <u>ant,</u> formed in a pixel grid by at least one multielement

4 printing array that is subject to a pattern of printing-den-

5 sity defects; said method comprising the steps of:

6   measuring such pattern of printing-density defects;

7   deriving a correction pattern from the measured pattern

8 of printing-density defects;

9   applying the correction pattern to modify a halftone

10 thresholding process; and

11   <u>for each said colorant,</u> printing such image <u>by said at</u>

12 <u>least one multielement array respectively,</u> using the modified

13 halftone thresholding process.

1   10. (original) The method of claim 9, for use with a print-

2 mask in plural-pass printing, and further comprising the steps

3 of, before or as a part of the applying step:

4   using such printmask to determine a relationship between

5 the halftone matrix and the multielement array; and

6   employing the relationship in the applying step to con-

7 trol application of the correction pattern to the halftone

8 matrix.

1   11. (original) The method of claim 9, wherein:

2   the printing step comprises single-pass printing.

1   12.   (original)   The method of claim 9, for use with said at
2   least one multielement incremental-printing array that com-
3   prises a plurality of scanning multielement printing arrays
4   that print in a corresponding plurality of different colors or
5   color dilutions, each multielement printing array being sub-
6   ject to a respective swath-height error; and wherein:
7   the measuring, deriving, applying and printing steps are
8   employed to modify swath height of at least one of the scan-
9   ning multielement printing arrays, for accommodating any
10   swath-height error present in each multielement printing array
11   respectively.

1   13.   (original)   The method of claim 9, for use with said at
2   least one multielement incremental-printing array that compri-
3   ses a plurality of multielement printing arrays that print in
4   a corresponding plurality of different colors or color dilu-
5   tions, each multielement printing array being subject to a
6   respective pattern of printing-density defects; and wherein:
7   the measuring, deriving, applying and printing steps are
8   each performed with respect to each multielement printing
9   array respectively.

1 14. (original) The method of claim 13, for use with such
2 plurality of multielement incremental-printing arrays that are
3 also each subject to a respective swath-height error; and
4 wherein:
5   the measuring, deriving, applying and printing steps are
6 also employed to modify swath height of at least one of the
7 multielement printing arrays, for accommodating any swath-
8 height error present in each multielement printing array
9 respectively.

1 15. (original) The method of claim 9, wherein:
2   the halftone thresholding process comprises definition of
3 a halftone matrix.

1 16. (original) The method of claim 9, wherein:
2   the halftone thresholding process comprises an error-
3 diffusion protocol.

1 17. (original) The method of claim 16, wherein the error-
2 diffusion protocol comprises at least one of:
3   a progressive error-distribution allocation protocol of
4 such error-diffusion halftoning; and
5   a decisional protocol for determining whether to mark a
6 particular pixel.

1 18. (original) The method of claim 9, wherein:
2   the applying step comprises replacing values above or
3 below a threshold value.

1 19. (original) The method of claim 9, wherein:

2   the applying step comprises multiplying values by a

3 linear factor.

1 20. (original) The method of claim 9, wherein:

2   the applying step comprises applying a gamma correction

3 function to values.

1 21. (original) The method of claim 9, wherein the modifying

2 step comprises a combination of at least two of:

3   replacing values above or below a threshold value;

4   multiplying each values by a linear factor; and

5   applying a gamma correction function to values.

1 22. (original) The method of claim 9, wherein:

2   for each of the plurality of multielement arrays, the

3 measuring, deriving and applying steps are each performed at

4 most only one time for a full image.

1 23. (original) The method of claim 9, wherein:

2   the applying step comprises modifying the darkness of

3 substantially each mark printed by an individual printing

4 element whose density is defective.

1 24. (original) The method of claim 9, wherein:

2   the applying step comprises modifying the average number

3 of dots printed by an individual printing element whose den-

4 sity is defective.

1 25. (currently amended) A method of printing a desired im-

2 age, based on input image data, by construction from individu-

3 al marks <u>of at least one colorant,</u> formed in a pixel grid by

4 at least one scanning multielement printing array; said print-

5 ing being subject to print-quality defects due to departure of

6 printing-medium advance from an optimum value; said method

7 comprising the steps of:

8   measuring a parameter related to such print-quality

9 defects;

10   based on the measured parameter, scaling such input image

11 data to compensate for said departure; and

12   <u>for each said colorant,</u> printing such <u>marks with said at</u>

13 <u>least one scanning multielement array</u> ~~image~~ using the scaled

14 input image data.

1 26. (original) The method of claim 25, wherein:

2   the parameter comprises such print-quality defects; and

3   the measuring step comprises measuring such print-quality

4 defects.

1 27. (original) The method of claim 26, wherein:

2   the defects comprise swath-height error; and

3   the measuring step comprises measuring swath-height

4 error.

28. (original) The method of claim 26, wherein:
   the defects comprise area-fill nonuniformity; and
   the measuring step comprises:

       using a sensing system to measure area-fill non-
           uniformity for plural printing-medium advance
           values, and

       selecting a printing-medium advance value that cor-
           responds to minimum area-fill nonuniformity.

29. (original) The method of claim 25, wherein:
   the parameter comprises such optimum value; and
   the measuring step comprises determining such optimum
value.

30. (original) The method of claim 25, for use with said at
least one scanning multielement printing array that comprises
a plurality of multielement printing arrays that print in a
corresponding plurality of different colors or color dilu-
tions, each multielement printing array being subject to a
respective swath-height error; wherein:
   the measuring, scaling and printing steps are each per-
formed with respect to each multielement printing array re-
spectively.

1 31. (original) The method of claim 30, wherein the printing
2 step comprises:
3   comparing optimum advance values or swath-height values
4 measured for the plurality of multielement printing arrays
5 respectively, to find the smallest of said values;
6   selecting a particular multielement printing array whose
7 said value is substantially the smallest;
8   using, in common for the plurality of printing arrays,
9 substantially said selected smallest value; and
10   for substantially each array other than the particular
11 array, operating with a respective reduced number of printing
12 elements and with rescaled data, to match an actual effective
13 swath height of the particular array.

1 32. (original) The method of claim 31, wherein:
2   said smallest of said values is determined taking into
3 account the maximum available number of printing elements in
4 the corresponding array.

1 33. (original) The method of claim 25, further comprising
2 the step of:
3   after the scaling step, iterating the measuring and
4 scaling steps to allow for nonlinearity in such print-quality
5 defects.

1   34.   (new)   Apparatus for printing a desired image on a print-
2   ing medium, based upon input image data, by construction from
3   individual marks formed in a pixel grid; said apparatus com-
4   prising:
5   at least one multielement incremental-printing array that
6   is subject to colorant-deposition error;
7   means for measuring such colorant-deposition error of the
8   at least one array;
9   means for modifying a multicolumn, multirow numerical
10 tabulation that forms a mapping between such input image data
11 and such marks, to compensate for the measured colorant-depo-
12 sition error; and
13   means for printing using the modified mapping;
14   wherein the multielement printing array is an inkjet
15 printhead.

1   35.   (new)   A method of printing a desired image, by construc-
2   tion from individual marks formed in a pixel grid by at least
3   one multielement printing array that is subject to a pattern
4   of printing-density defects; said method comprising the steps
5   of:
6   measuring such pattern of printing-density defects;
7   deriving a correction pattern from the measured pattern
8   of printing-density defects;
9   applying the correction pattern to modify a halftone
10 thresholding process; and
11   printing such image using the modified halftone thresh-
12 olding process;
13   wherein the multielement printing array is an inkjet
14 printhead.

1   36. (new) A method of printing a desired image, based on

2   input image data, by construction from individual marks formed

3   in a pixel grid by at least one scanning multielement printing

4   array; said printing being subject to print-quality defects

5   due to departure of printing-medium advance from an optimum

6   value; said method comprising the steps of:

7   measuring a parameter related to such print-quality

8   defects;

9   based on the measured parameter, scaling such input image

10 data to compensate for said departure; and

11   printing such image using the scaled input image data;

12   wherein the multielement printing array is an inkjet

13 printhead.

1   37. (new) Apparatus for printing a desired image on a print-

2   ing medium, based upon input image data, by construction from

3   individual marks of at least one colorant, formed in a pixel

4   grid; said apparatus comprising:

5   for each colorant, respective means for printing incre-

6   mentally in that colorant;

7   each said printing means, for a particular one colorant,

8   comprising at least one respective incremental-printing array

9   that is subject to colorant-deposition error;

10   means for measuring such colorant-deposition error of the

11 at least one array;

12   means for modifying a multicolumn, multirow numerical

13 tabulation that forms a mapping between such input image data

14 and such marks, to compensate for the measured colorant-depo-

15 sition error; and

16   means for printing using the modified mapping.

1   38. (new) Apparatus for printing a desired image on a print-
2   ing medium, based upon input image data, by construction from
3   individual marks formed in a pixel grid; said apparatus com-
4   prising:

5   at least one multihundred-element printing array that is
6   subject to colorant-deposition error;

7   means for measuring such colorant-deposition error of the
8   at least one array;

9   means for modifying a multicolumn, multirow numerical
10   tabulation that forms a mapping between such input image data
11   and such marks, to compensate for the measured colorant-depo-
12   sition error; and

13   means for printing using the modified mapping.

1   39. (new) The apparatus of claim 38, wherein:
2   the multihundred-element array has at least three hundred
3   printing elements.

1 40. (new) Apparatus for printing a desired image on a print-
2 ing medium, based upon input image data, by construction from
3 individual marks formed in a pixel grid; said apparatus com-
4 prising:
5   at least one multielement incremental printing array,
6 having at least thirty printing elements, that is subject to
7 colorant-deposition error;
8   means for measuring such colorant-deposition error of the
9 at least one array;
10   means for modifying a multicolumn, multirow numerical
11 tabulation that forms a mapping between such input image data
12 and such marks, to compensate for the measured colorant-depo-
13 sition error; and
14   means for printing using the modified mapping.

1 41. (new) The apparatus of claim 40, wherein:
2   the at least one multielement incremental printing array
3 comprises a scanning printhead or a full-page-width printhead.

1 42. (new) The apparatus of claim 40, wherein:
2   the printing means comprise at least one microprocessor
3 controlling all of the at least thirty elements simultaneously
4 during printing to select, and selectively actuate, particular
5 elements for printing of particular pixels respectively.